

absolute maximum: literal highest point

Local/relative maximum: point goes inc \rightarrow dec or dec \rightarrow inc $(\infty, -\infty)$

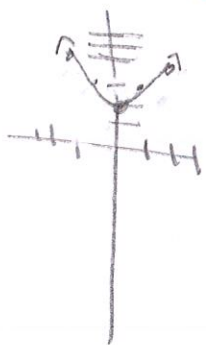
absolute minimum: literal lowest point

local/relative minimum: point where it inc \rightarrow dec or dec \rightarrow inc

even/odd functions

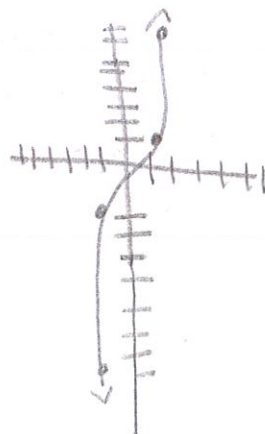
even if $f(-x) = f(x)$ for all x in the domain
"Symmetric around y-axis"

odd if $f(-x) = -f(x)$ for all x in the domain
"Symmetric around origin"



x	f(x)
1	3
2	6
3	11
-1	3
-2	6
-3	11

Same
"even"



x	f(x)
1	1
2	8
3	27
-1	-1
-2	-8
-3	-27

different
"odd"

absolute maximum: literal highest point

local/relative maximum: point goes inc \rightarrow dec or dec \rightarrow inc $(\infty, -\infty)$

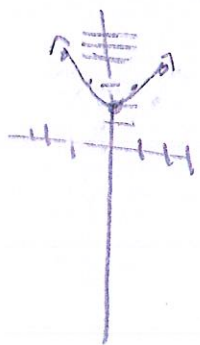
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Non/odd functions

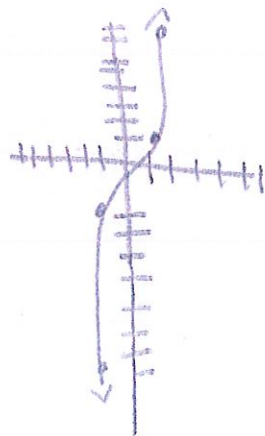
Even if $f(-x) = f(x)$ for all x in the domain
"Symmetric around y-axis"

Odd if $f(-x) = -f(x)$ for all x in the domain
"Symmetric around origin"



x	f(x)
1	3
2	6
3	11
-1	3
-2	6
-3	11

Same
"even"



x	f(x)
1	3
2	8
3	21
-1	-3
-2	-8
-3	-21

different
"odd"

Combinations:

$$(f+g)(x) = f(x) + g(x)$$

$$(f-g)(x) = f(x) - g(x)$$

$$(fg)(x) = f(x) \cdot g(x)$$

$$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$$

$$(f \circ g)(x) = f(g(x))$$

if x is not in the domain of $g(x)$, it can't be in the domain of $f(g(x))$

* Any x for which $g(x)$ gives an output that is not in the domain of $f(x)$

Inverses:

$$f(x) = 3x + 2$$

$$f^{-1}(x) = \frac{x-2}{3}$$

x	$f(x)$
1	5
2	8
3	11
4	14

x	$f^{-1}(x)$
5	1
8	2
11	3
14	4

Slope line: $\frac{f(b) - f(a)}{b - a}$

Transformations:

$f(x) \pm c \rightarrow$ up/down

$f(x \pm c) \rightarrow$ left/right

$-f(x) \rightarrow$ reflects x -axis

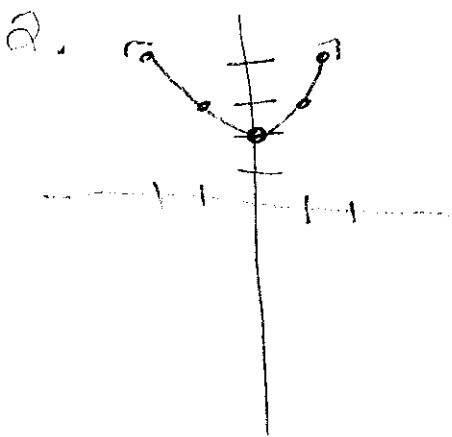
$f(-x) \rightarrow$ reflects y -axis

$c f(x) \rightarrow$ shrink / stretch ~~vertical~~ ^{vertical}

$f(cx) \rightarrow$ shrink / stretch horizontal

Practice Problems

1. $x^2 + 4x + 4$



a) Is the equation even or odd?

b) List the domain and range

3. Find the inverse of $4x + 5$

4. Graph $2x + 6$

5. $3x^2 + 4x + 6$

hey

1. $x^2 + 4x + 4$

$= \begin{array}{c} 4 \\ a \quad \times \quad a \\ 4 \end{array}$

$= x^2 + 2x + 2x + 4$

$= x(x+2) + 2(x+2)$

$= (x+2)(x+2)$

$= x = -2, -2$

2. a) even

b) $D: (-\infty, \infty), R: [2, \infty)$

3. $4x + 5$

$= x = 4y + 5$

$= \frac{x-5}{4} = \frac{4y}{4}$

$= \frac{x-5}{4}$

4.

